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Elmore et al.

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(54) **WALL PACK LUMINAIRE**

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(51) **Int. Cl.**

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F21V 19/00	(2006.01)
F21V 15/01	(2006.01)
F21V 29/74	(2015.01)

(52) **U.S. Cl.**

CPC ***F21S 8/033*** (2013.01); ***F21V 15/01*** (2013.01); ***F21V 19/001*** (2013.01); ***F21V 21/02*** (2013.01); *F21V 29/74* (2015.01)

(58) **Field of Classification Search**

CPC F21S 8/033; F21V 15/01; F21V 19/001; F21V 21/02; F21V 29/74

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,426,676	A ‡	1/1984	Taylor	F21S 8/086 362/37
4,507,719	A ‡	3/1985	Quiogue	F21V 29/15 362/14

(Continued)

FOREIGN PATENT DOCUMENTS

CN	206036792	3/2017
IT	BS20100103	12/2011
WO	2017156268	9/2017

OTHER PUBLICATIONS

PCT/US2018/031133 International Search Report and Written Opinion dated Jul. 6, 2018 (18 pages).‡

(Continued)

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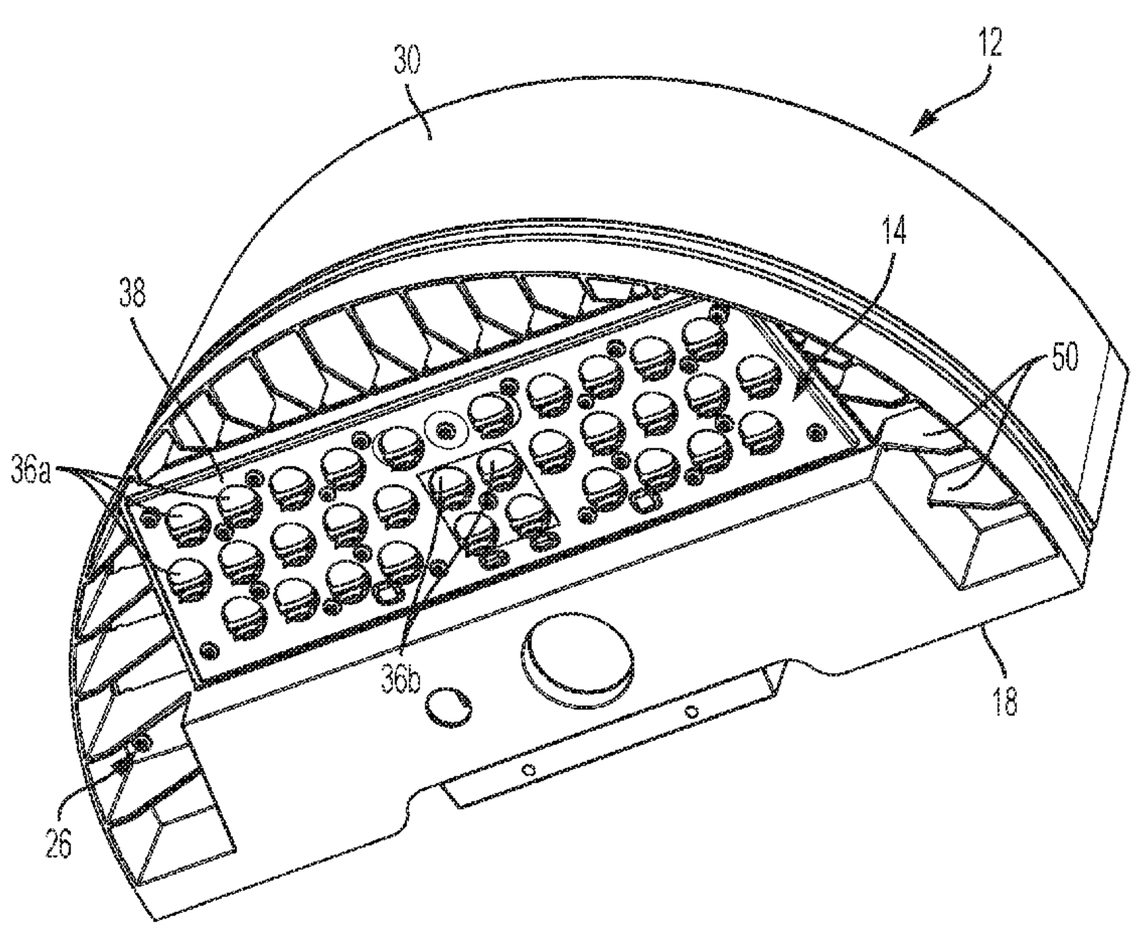
(57) **ABSTRACT**

A luminaire includes a housing having an outer wall and a mounting wall configured to be secured to a structure. The housing further includes a compartment defined at least partially between the outer wall and the mounting wall. The compartment is configured to support a plurality of control devices. A support is coupled to the housing and supports a light emitter assembly. The support includes a plurality of fins in thermal communication with the light emitter assembly. A wall is positioned between the compartment and the plurality of fins.

20 Claims, 6 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

8,283,874	B2 ‡	10/2012	Buelow, II	H05B 45/00 315/29
8,342,709	B2 ‡	1/2013	Lueken	F21S 8/086 362/24
9,016,892	B1 ‡	4/2015	Scribante	F21V 29/763 362/22
9,109,787	B2 ‡	8/2015	Nankil	F21V 5/02
20,160,305		10/2016	Duckworth et al.	
9,521,727	B1 ‡	12/2016	Clements	F21V 23/0471
9,523,491	B2 ‡	12/2016	Bailey	F21V 29/507
2008/0080196	A1 ‡	4/2008	Ruud	F21S 2/005 362/37
2009/0120612	A1 ‡	5/2009	Zhang	F21K 9/00 165/80
2009/0296403	A1 *	12/2009	Zhang	F21S 8/033 362/294
2010/0002432	A1 ‡	1/2010	Romano	F21V 7/0008 362/23
2012/0087118	A1 ‡	4/2012	Bailey	F21V 5/04 362/23
2012/0268952	A1 ‡	10/2012	Newton	B23P 11/00 362/36
2014/0376221	A1 ‡	12/2014	Eliason	F21V 5/04 362/23
2015/0345772	A1 ‡	12/2015	Duckworth	F21V 29/763 362/37
2016/0305643	A1 ‡	10/2016	Duckworth	F21V 23/008
2016/0320035	A1 ‡	11/2016	Duckworth	F21V 15/01
2017/0299170	A1 ‡	10/2017	Brunelli	F21S 8/033

OTHER PUBLICATIONS

PCT/US2018/031133 International Search Report and Written Opinion dated Jul. 6, 2018.

European Patent Application No. 18794387.3 extended European search report and search opinion dated Dec. 1, 2020.

* cited by examiner

‡ imported from a related application

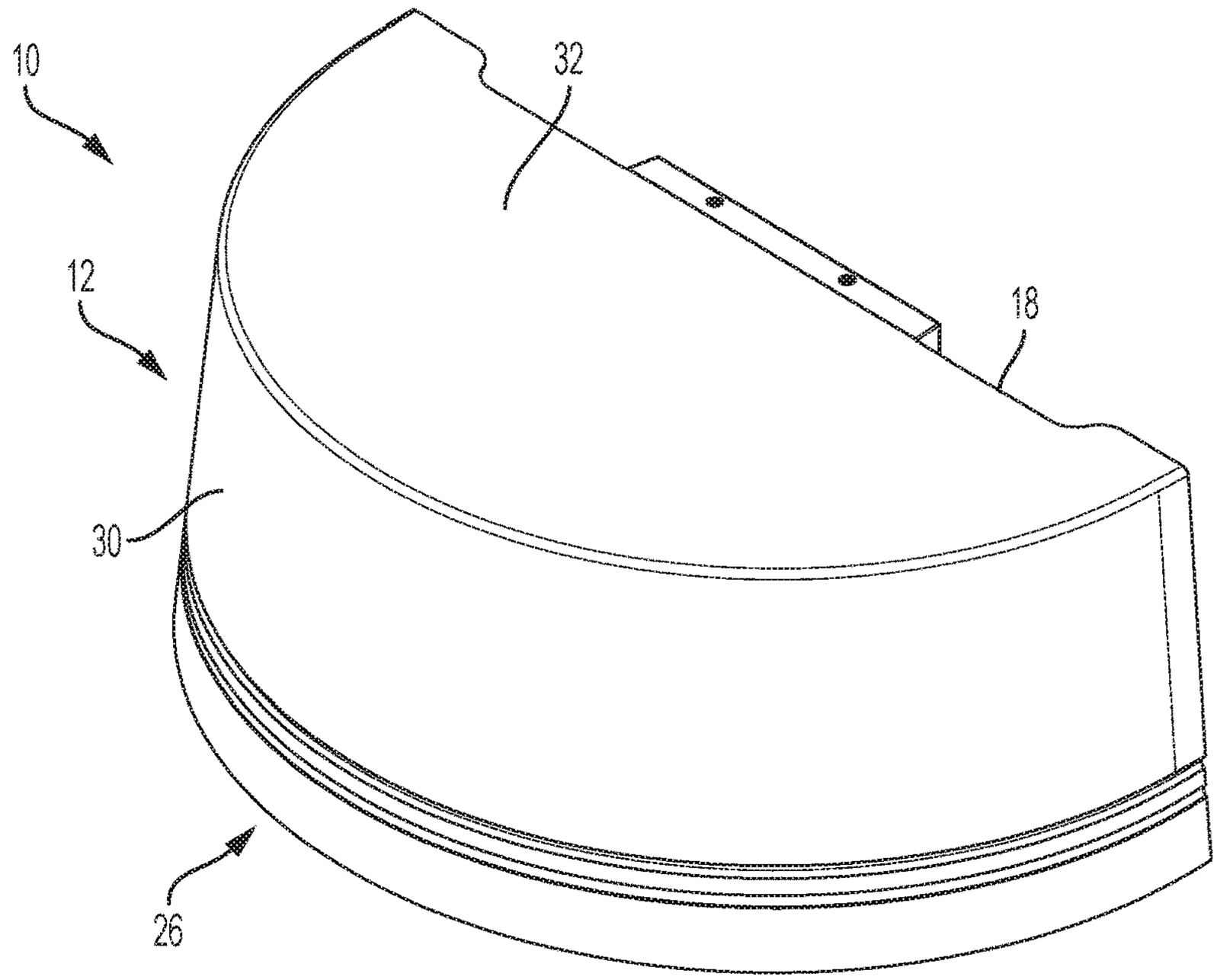


FIG. 1

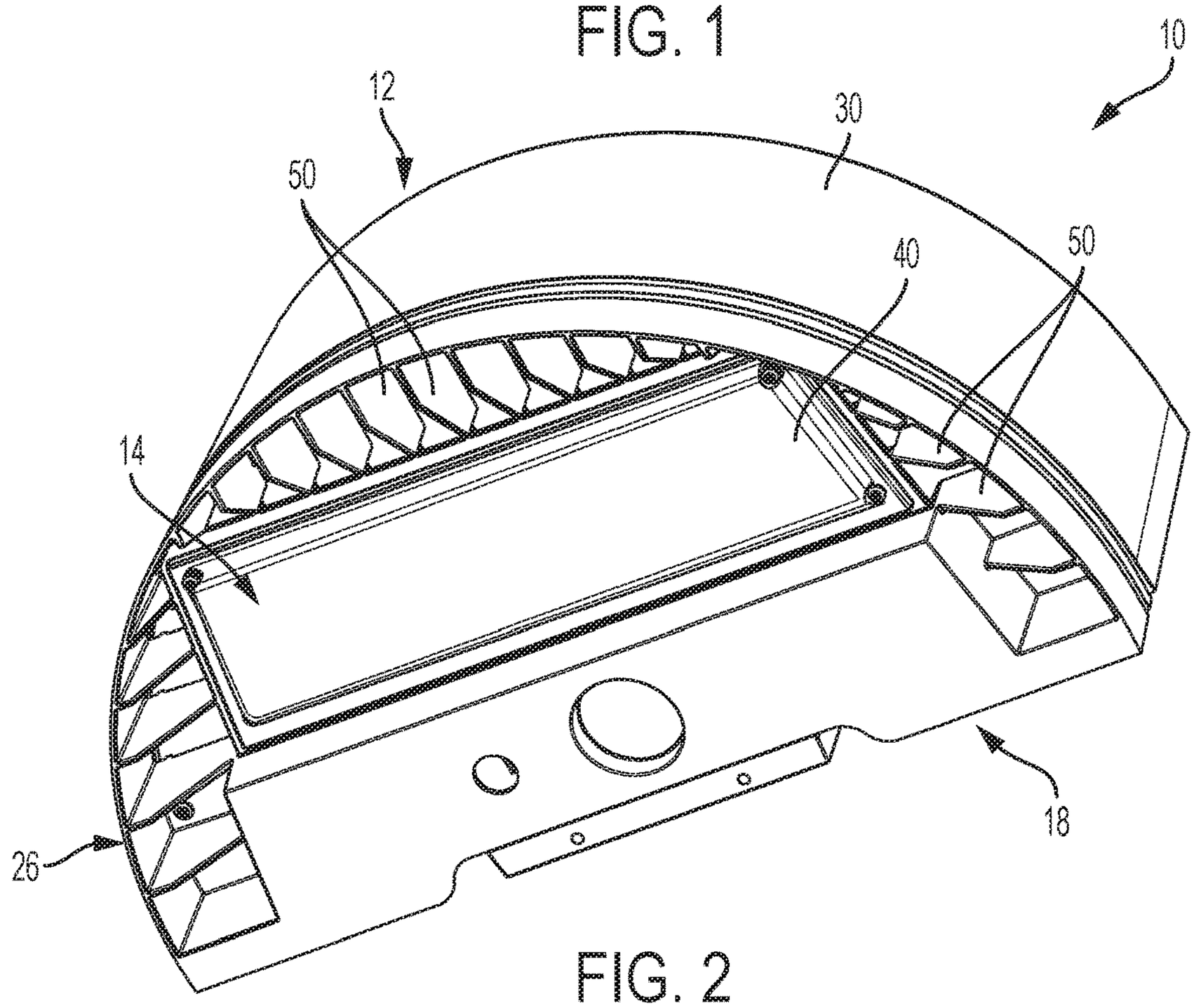


FIG. 2

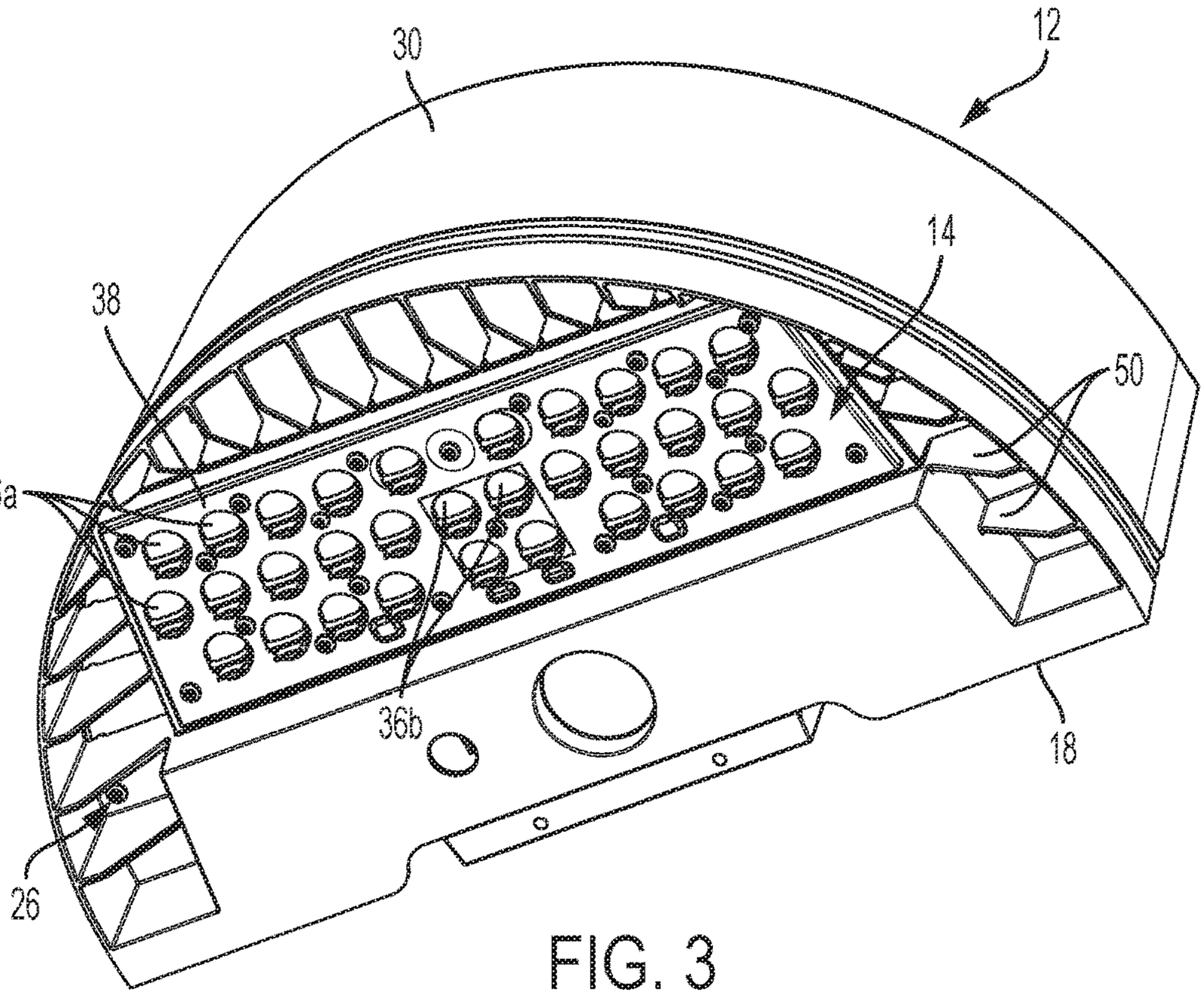


FIG. 3

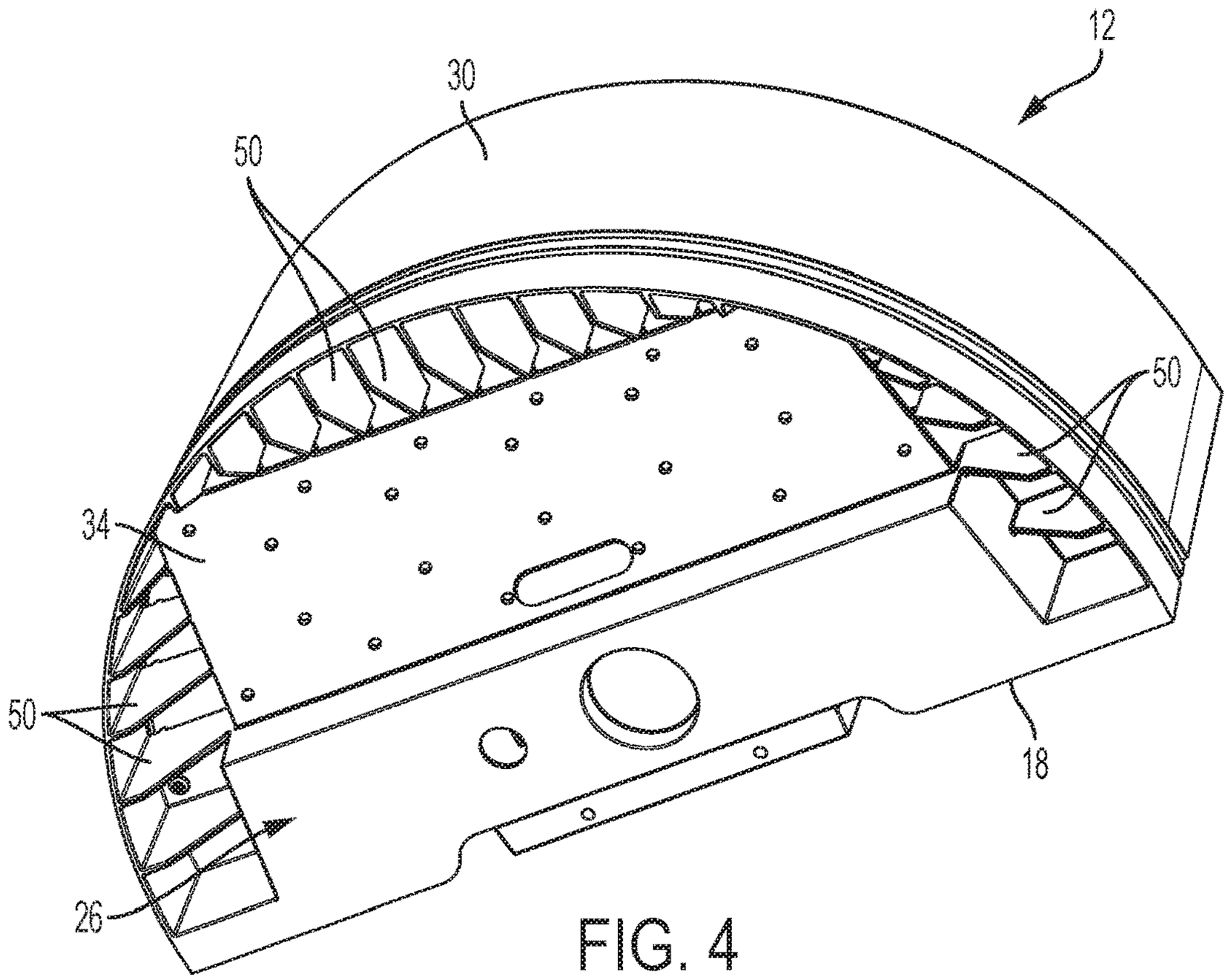


FIG. 4

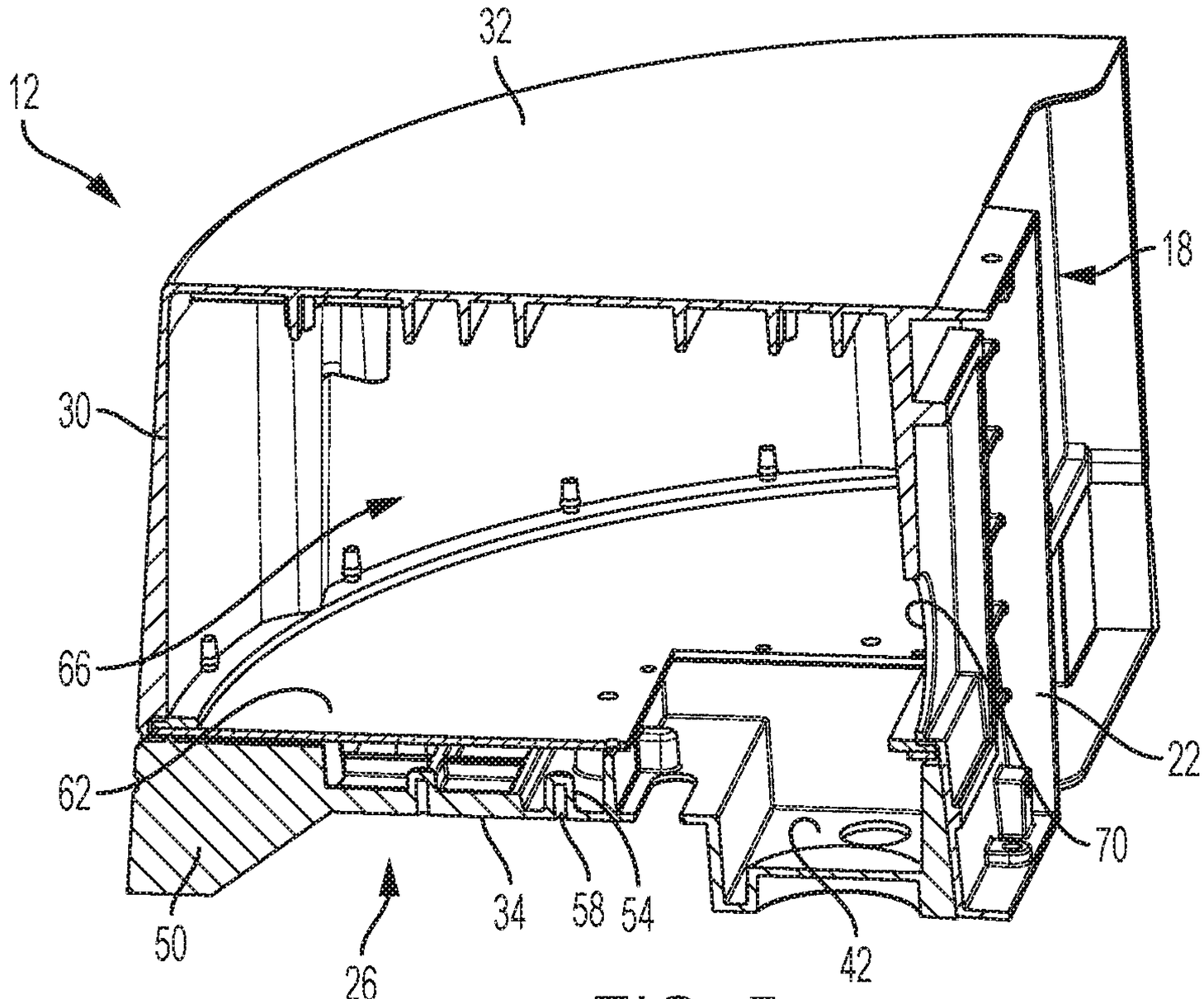


FIG. 5

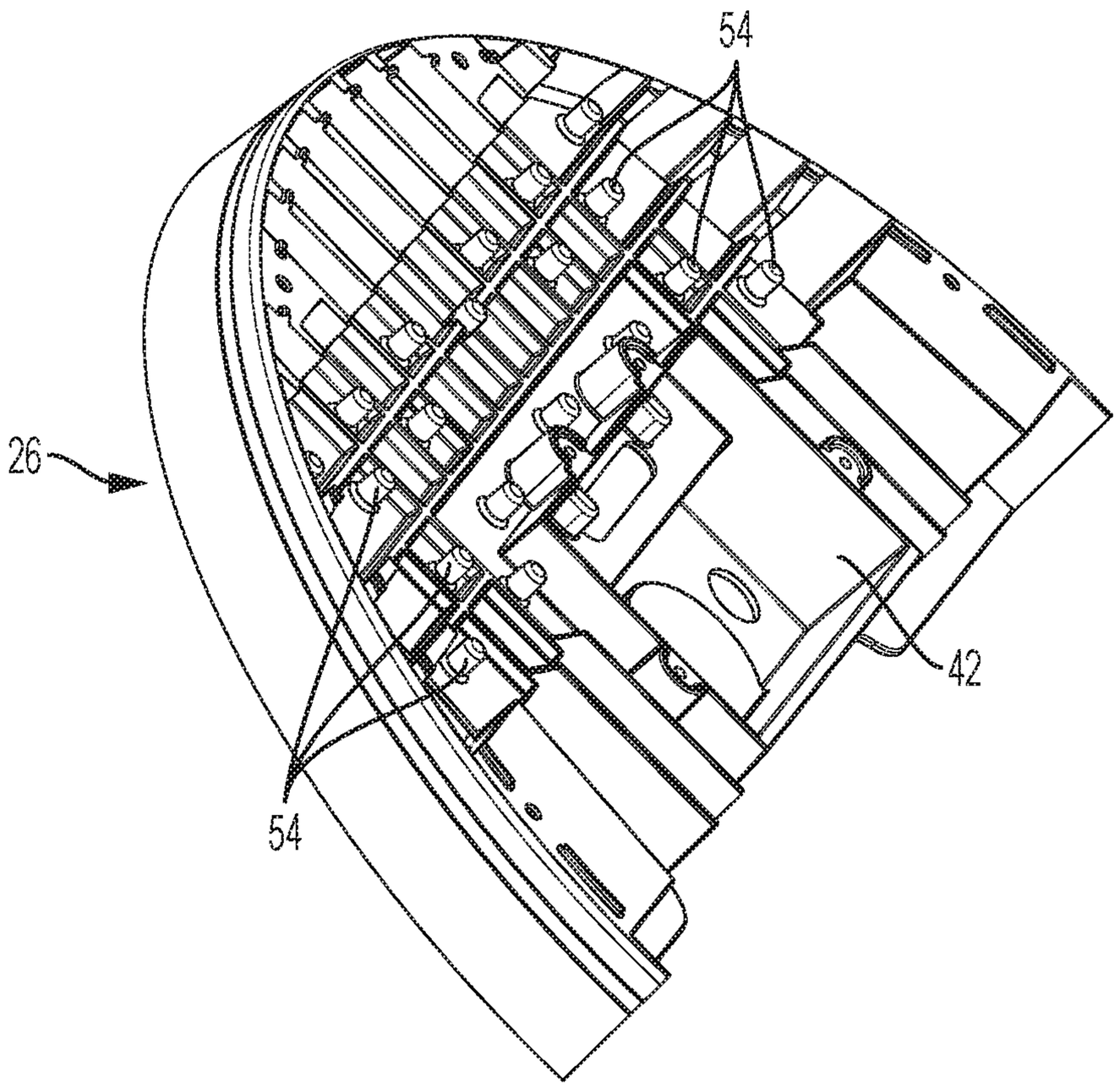


FIG. 6

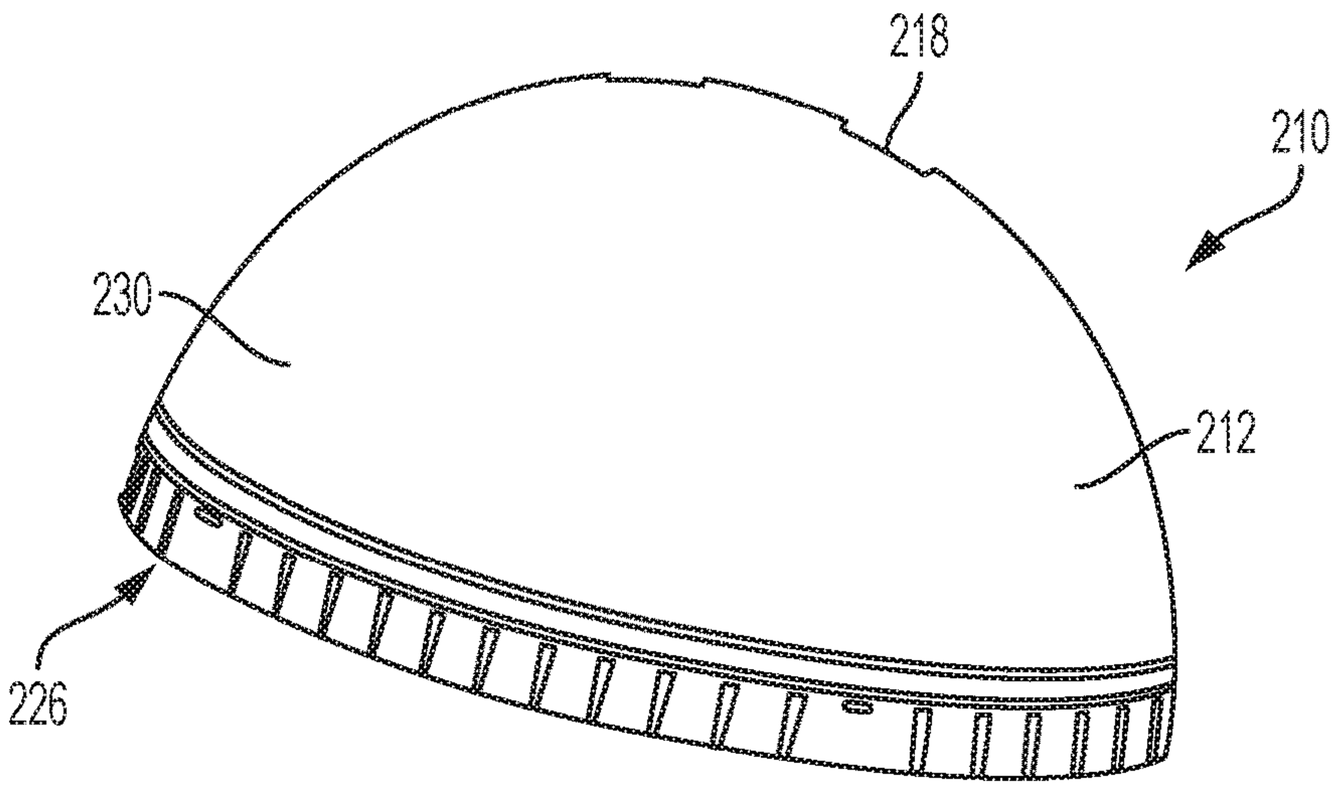


FIG. 7

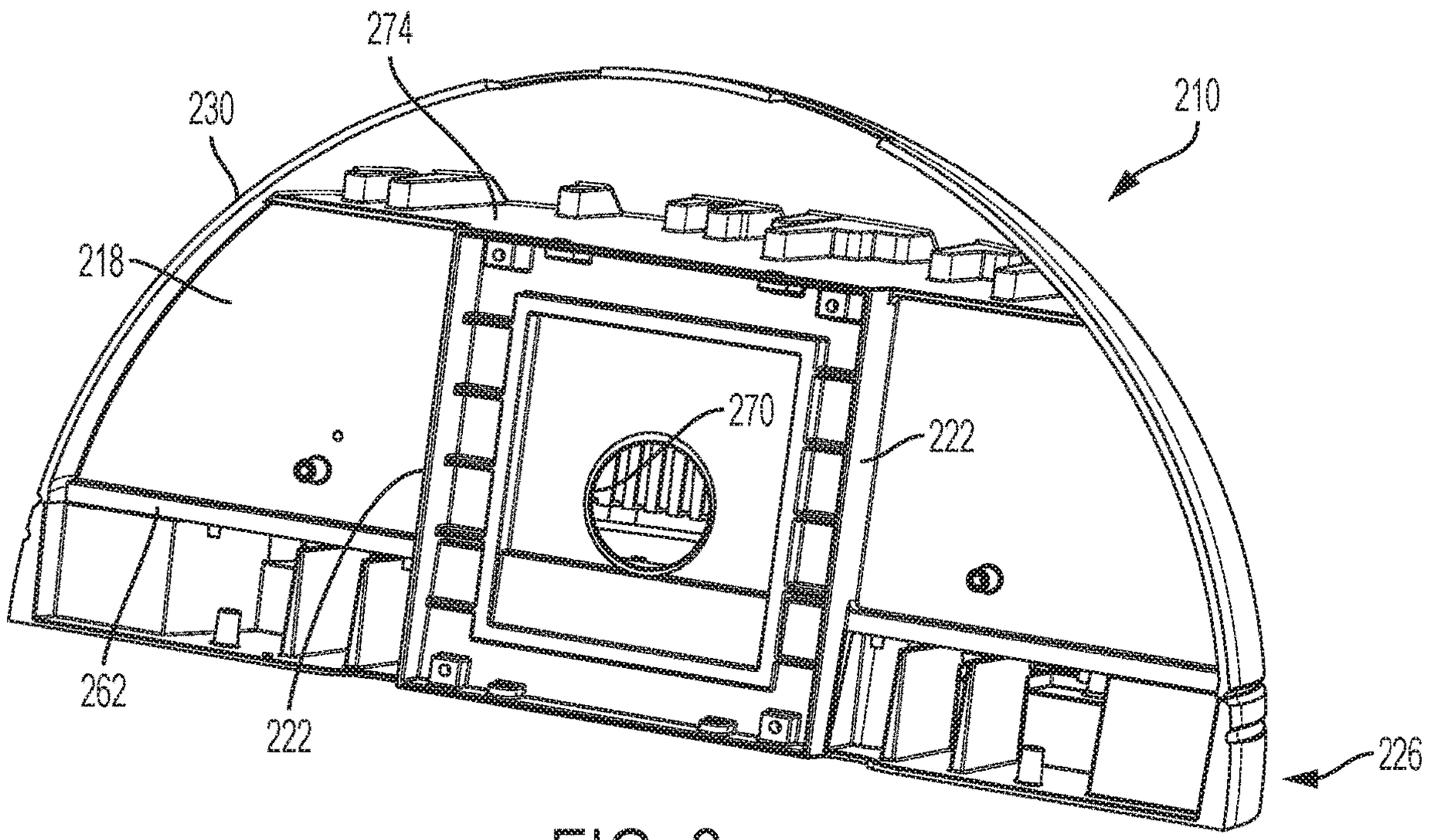


FIG. 8

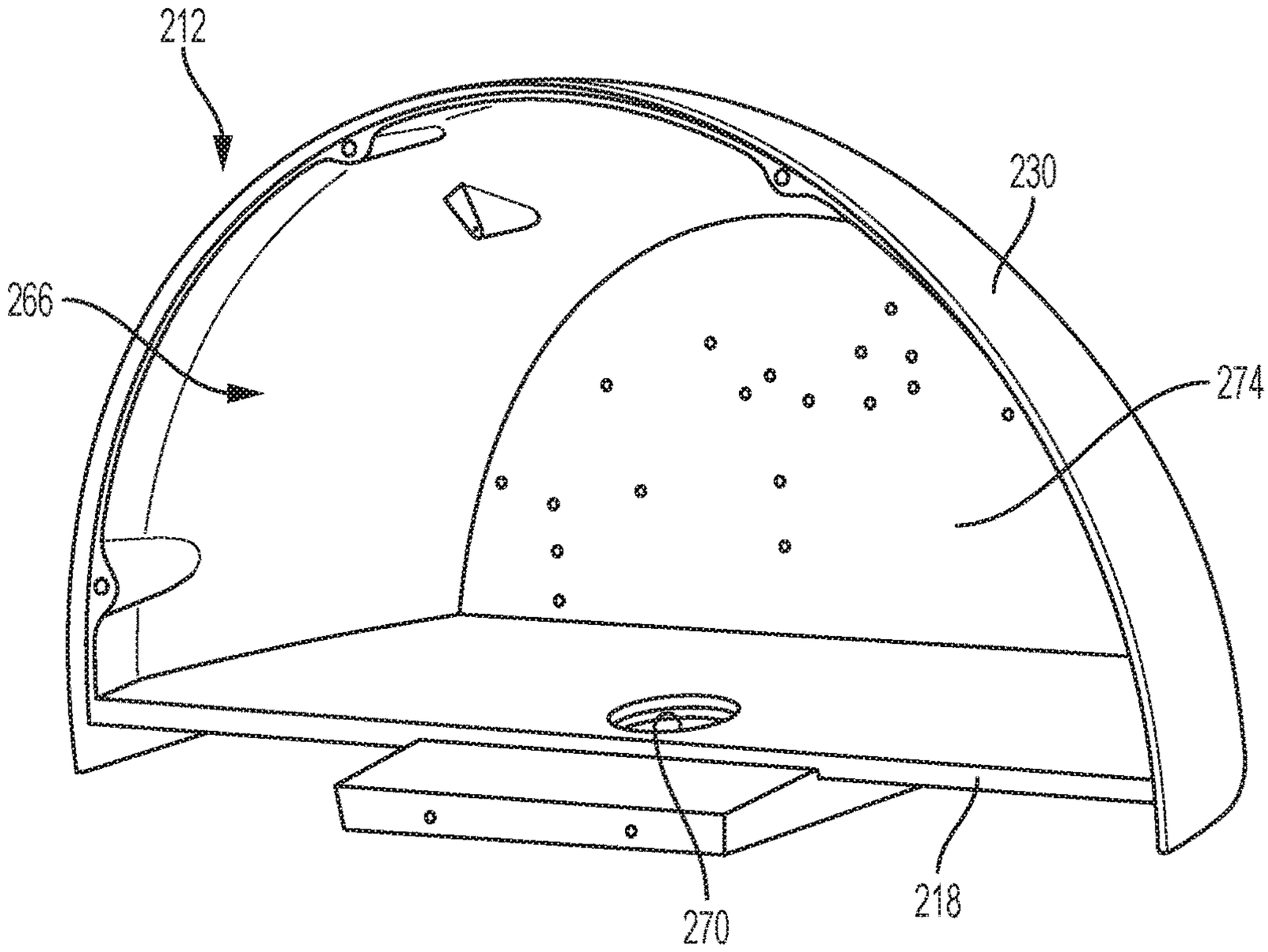


FIG. 9

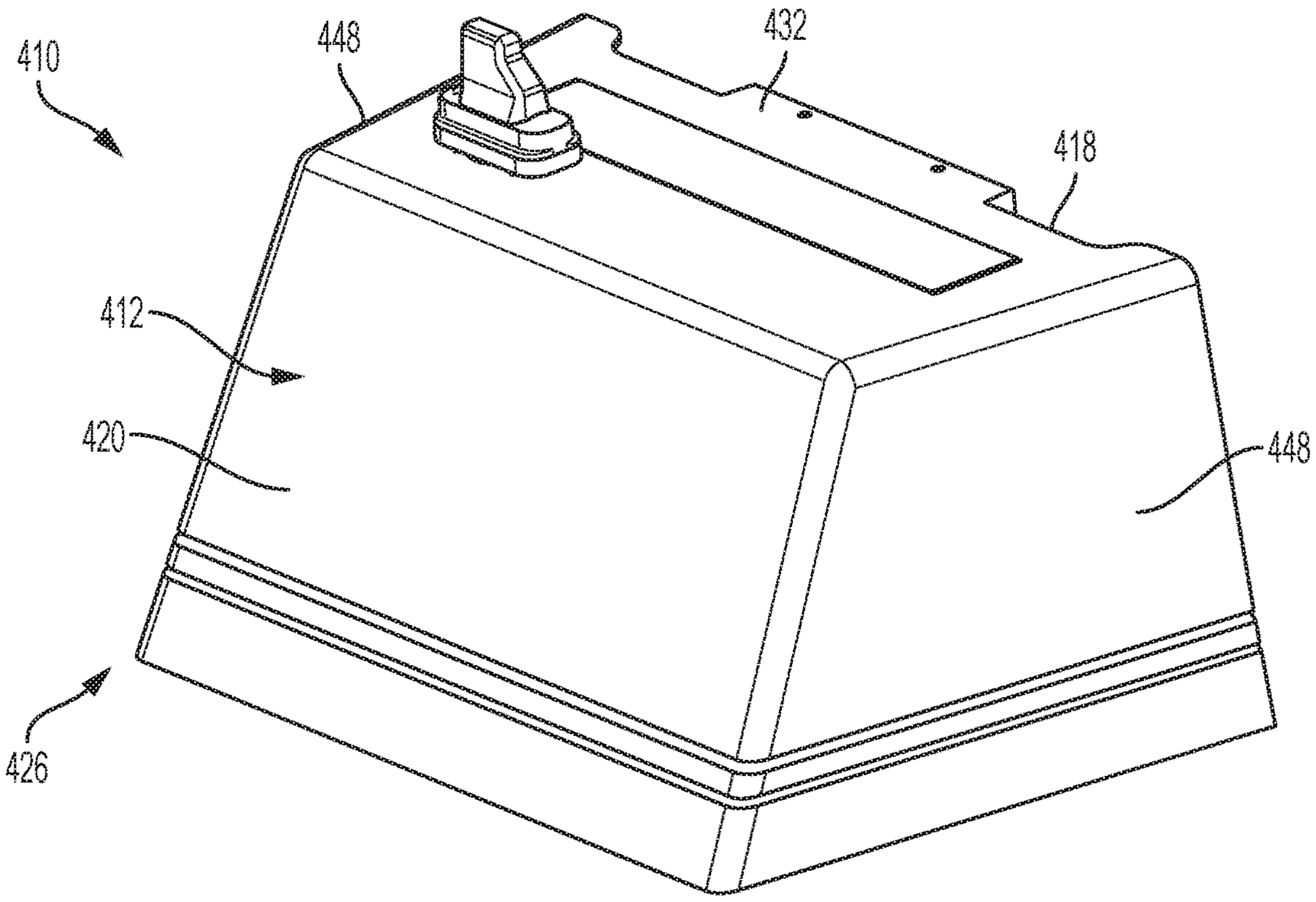


FIG. 10

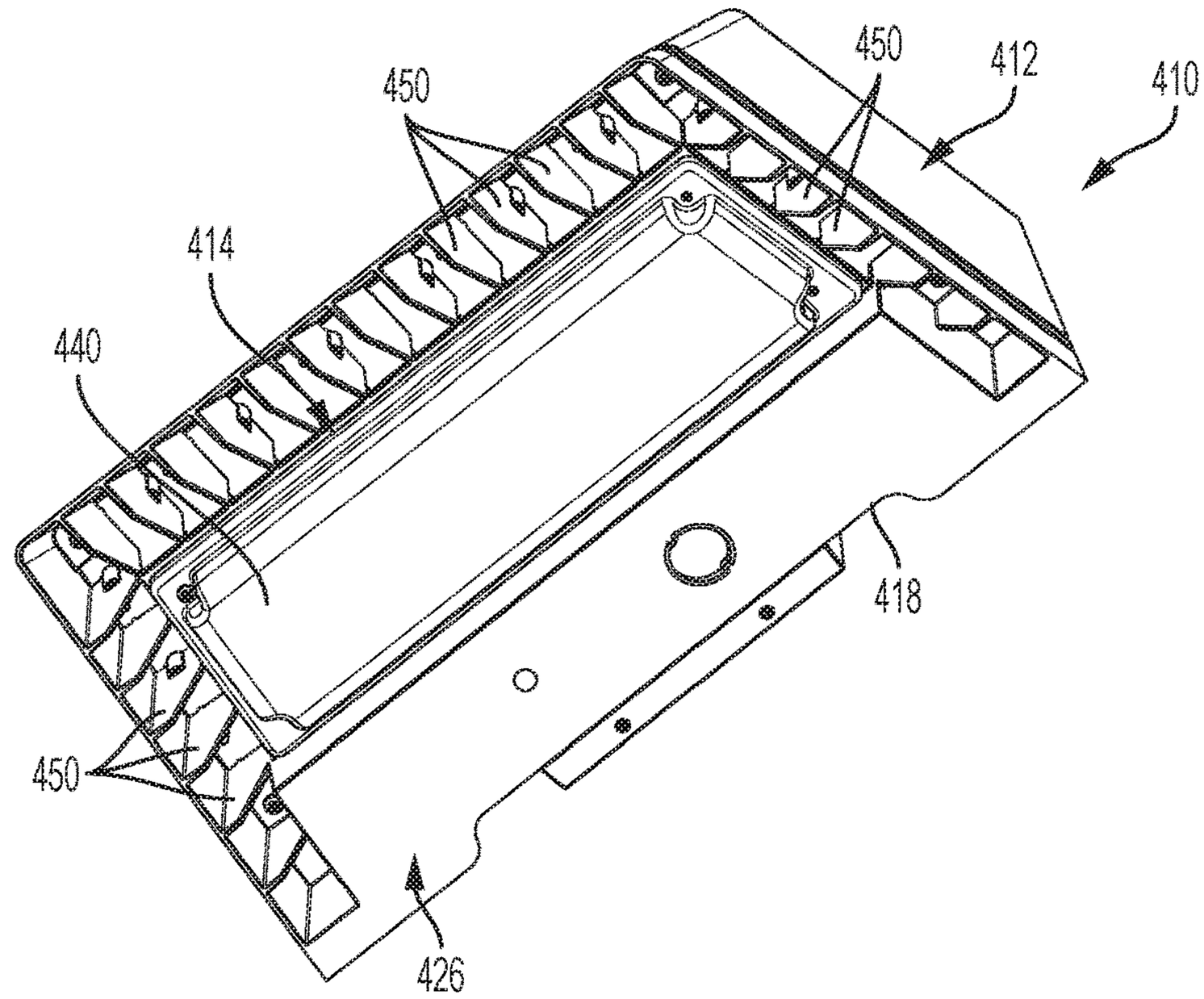


FIG. 11

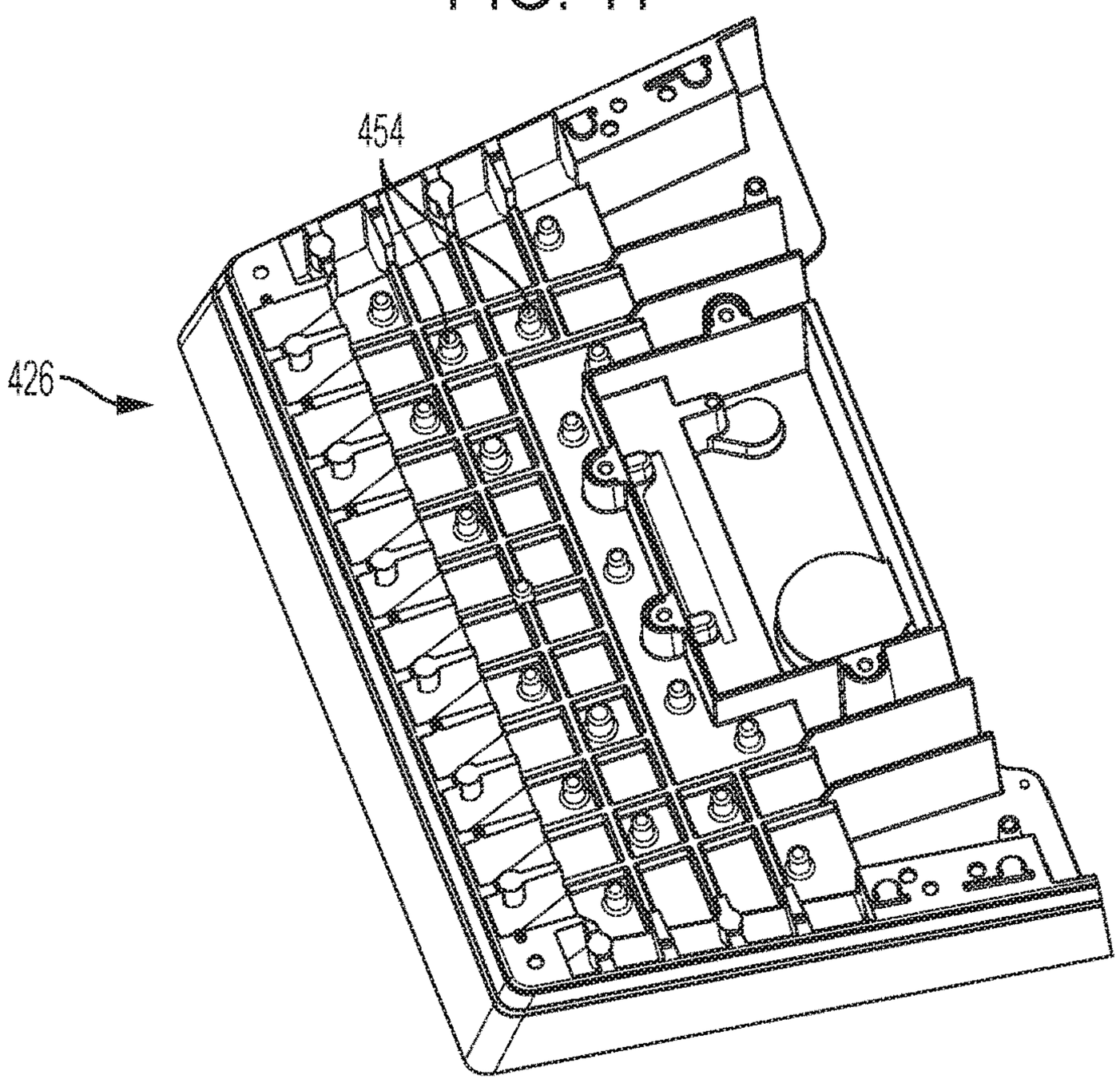


FIG. 12

WALL PACK LUMINAIRE

RELATED APPLICATION(S)

This application is a continuation of U.S. application Ser. No. 15/971,516, filed May 4, 2018, which is based on U.S. Provisional Application Ser. No. 62/501,851, filed May 5, 2017, the disclosures of which are incorporated herein by reference in their entirety and to which priority is claimed.

BACKGROUND

The application relates to outdoor luminaires and components for outdoor luminaires.

Light fixtures, or luminaires, include electric light sources to provide an aesthetic and functional housing in both interior and exterior applications. Wall pack luminaires may provide exterior lighting for buildings around walkways and exit doors, and may provide interior lighting near hallways, entryways, or other areas. Wall pack luminaires are typically secured to walls or other structures and provide downward light distribution from an elevated position.

Area lights may include light emitting diodes (LEDs) as a light source in place of conventional incandescent and fluorescent lamps. The use of LEDs results in unique thermal considerations. For example, LEDs and their control components (such as drivers, circuitry, and battery backups) produce more heat than traditional light sources. Moreover, LEDs can degrade over time if exposed to high levels of heat. The internal layout and thermal considerations for each luminaire is unique.

SUMMARY

According to an exemplary embodiment, a luminaire includes a housing having an outer wall and a mounting wall configured to be secured to a structure. The housing further includes a compartment defined at least partially between the outer wall and the mounting wall. The compartment is configured to support a plurality of control devices. A support is coupled to the housing and supports a light emitter assembly. The support includes a plurality of fins in thermal communication with the light emitter assembly. A wall is positioned between the compartment and the plurality of fins.

According to another exemplary embodiment, a luminaire includes a housing having a lower wall, an outer wall and a mounting wall configured to be secured to a structure. The housing further includes a compartment defined at least partially between the outer wall and the mounting wall. The compartment is configured to support a control device. A support is coupled to the housing. The support includes a base, a first set of fins extending from the base away the housing, and a second set of fins extending from the base toward the housing. A light emitter assembly is connected to the support. The light emitter assembly includes a first set of light emitters having a first light distribution and controlled to be deactivated during an emergency mode and a second set of light emitters having a second light distribution and controlled to be activated during an emergency mode.

The above-described and other aspects and features of various exemplary embodiments of the present disclosure will be appreciated and understood by those skilled in the art from the following detailed description and drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is an upper perspective view of an exemplary luminaire.

FIG. **2** is a lower perspective view of the luminaire of FIG. **1**.

FIG. **3** is a lower perspective view of the luminaire of FIG. **1**, with a lens removed.

FIG. **4** is a lower perspective view of the luminaire of FIG. **1**, with a lens and light emitter assembly removed.

FIG. **5** is a cross-section view of the luminaire of FIG. **1**, viewed along section **5**-**5**.

FIG. **6** is a perspective view of a light emitter assembly support.

FIG. **7** is an upper perspective view of a luminaire according to another embodiment.

FIG. **8** is rear perspective view of the luminaire of FIG. **7**.

FIG. **9** is a lower perspective view of the luminaire of FIG. **7**.

FIG. **10** is an upper perspective view of a luminaire according to another embodiment.

FIG. **11** is a lower perspective view of the luminaire of FIG. **10**.

FIG. **12** is a perspective view of a light emitter assembly support.

Before any embodiments are explained in detail, it is to be understood that the disclosure is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the drawings. The disclosure is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. Use of "including" and "comprising" and variations thereof as used herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Use of "consisting of" and variations thereof as used herein is meant to encompass only the items listed thereafter and equivalents thereof. Unless specified or limited otherwise, the terms "mounted," "connected," "supported," and "coupled" and variations thereof are used broadly and encompass both direct and indirect mountings, connections, supports, and couplings.

DETAILED DESCRIPTION

Various exemplary embodiments of this application are directed to luminaire components that provide a base assembly so that different exterior and interior components can be used with the base components to provide different aesthetic designs, interior controls, and light outputs. For example, common housings and/or mounting features can accommodate different configurations of luminaires that include one or more different types of light emitters, and exterior features such as covers and lenses. The luminaire components also provide efficient thermal management across the range of configurations. This allows customers to customize a luminaire to a desired architectural design within the same product line.

FIGS. **1** and **2** illustrate a wall pack luminaire **10** including a housing **12**, a light emitter assembly **14**, and a light emitter support **26**. In the illustrated embodiment, the housing **12** includes a rear wall or mounting wall **18** configured to connect to a mounting surface (not shown). An outer wall **30** extends outwardly from the mounting wall **18**, and an upper wall **32** defines an upper surface of the housing **12**. The upper wall **32** may be connected to both the mounting wall **18** and the outer wall **30**. The light emitter support **26** may be secured to a lower end of the housing **12** and to the mounting wall **18**. Also, the housing **12** may be oriented

such that the light emitter assembly **14** is oriented in a downward direction. In the illustrated embodiment, the outer wall **30** has a semi-cylindrical shape. As best shown in FIG. **5**, the mounting wall **18** includes flanges **22** for securing the housing **12** to the mounting surface (not shown), and an opening **70** for receiving a power supply conduit (e.g., main power).

As shown in FIGS. **3** and **4**, the light emitter assembly **14** is secured to a lower surface of a base **34** (FIG. **4**) of the light emitter support **26**. In the illustrated embodiment, the light emitter assembly **14** includes light emitting diodes **36** (LEDs) secured to a substrate or lightboard **38**. The light emitter assembly **14** includes a plurality of first LEDs **36***a* and a plurality of second LEDs **36***b*. A first type of lens or optic can be positioned over the first LEDs **36***a* and a second lens or optic can be positioned over the second LEDs **36***b* so that the light distribution from the first LEDs **36***a* is different than the light distribution from the second LEDs **36***b*. An outer lens **40** (FIG. **2**) may extend over the LEDs. The outer lens **40** can be translucent to simply provide cover the light emitters, or it can be configured to modify the light output.

In some embodiments, the first LEDs **36***a* and the second LEDs **36***b* may be activated during normal operation, while the second LEDs **36***b* alone are operated in a low-power or emergency mode (i.e., the second LEDs **36***b* may be operated by a backup battery during a loss of mains power). In some embodiments, the second LEDs **36***b* are activated during a lower-power or emergency mode only. A sensor (e.g., an occupancy sensor or ambient light sensor—not shown) may be secured on the light emitter support **26** in a compartment **42** (FIGS. **5** and **6**) adjacent the light emitter assembly **14**.

The light emitter support **26** includes fins **50** for dissipating heat produced by the LEDs **36** and maintaining a desired operating temperature of the luminaire **10**. In the illustrated embodiment, each fin **50** extends orthogonally with respect to the base **34** and extends to the outer wall **30**. Stated another way, each fin **50** is oriented either in a direction that is substantially parallel to the mounting wall **18** or in a direction that is substantially perpendicular to the mounting wall **18**. In addition, each fin **50** extends downwardly from a plane of the base **34** toward the lower edge of the outer wall **30**.

As shown in FIGS. **5** and **6**, an upper surface of the light emitter support **26** includes bosses **54** and a plurality of fastener holes **58** (FIG. **5**). Each fastener hole **58** is aligned with corresponding holes in one of the base **34** and a lower wall **62** of the housing **12**. Fasteners (e.g., screws) may be inserted through the holes **58** to secure the lightboard **38** to the base **34** and/or to secure the light emitter support **26** to the lower wall **62**. As shown in FIG. **5**, the housing **12** includes an enclosed compartment **66** defined between the upper wall **32**, the lower wall **62**, the outer wall **30**, and the mounting wall **18**. Mounting features (e.g., bosses and holes) allow control components (such as drivers, surge protectors, fuses, batteries, photocells, sensors, wireless communication devices, etc.) to be connected to the housing **12**. Other features such as clips or protrusions may be used. The mounting features can directly connect control components or brackets can support and retain various control components in the enclosed compartment **66**. Accordingly, the lower wall **62** provides an insulating wall between the control components and the fins **50** and other heat dissipation structures of the light emitter support **26**.

FIGS. **7-9** illustrate a luminaire **210** according to another embodiment. The luminaire **210** is similar to the luminaire **10** described above with respect to FIGS. **1-6**, and similar features are identified with similar reference numbers, plus 200. For the sake of brevity, only differences are described in detail.

The luminaire **210** includes a housing **212** including an outer wall **230**. The outer wall **230** has a quarter spherical shape. As best shown in FIGS. **8** and **9**, the housing **212** includes a compartment **266** that is partially enclosed by a lower wall **262** and an upper interior wall **274**. In the illustrated embodiment, the lower wall **262** is formed on a light emitter support **226** (FIG. **8**).

FIGS. **10-12** illustrate a luminaire **410** according to another embodiment. The luminaire **410** is similar to the luminaire **10** described above with respect to FIGS. **1-6**, and similar features are identified with similar reference numbers, plus 400. For the sake of brevity, only differences are described in detail.

The luminaire **410** includes a housing **412** and a light emitter support **426** coupled to a lower end of the upper portion. As shown in FIG. **10**, the housing **412** has a mounting wall **418**, a front wall **420** opposite the mounting wall **418**, an upper wall **432**, and side walls **448**. The housing **412** defines a generally trapezoidal profile. In addition, as shown in FIG. **11**, a light emitter assembly **414** is secured to the light emitter support **426** and includes a lens **440** to provide a desired light distribution. The support **426** includes fins **450**, and each fin **50** is oriented either in a direction that is substantially parallel to the mounting wall **418** or in a direction that is substantially perpendicular to the mounting wall **418**. In addition, each fin **50** extends downwardly from the plane of the light emitter assembly **414** toward the lower edge of the front wall **420** and side walls **448**.

The foregoing detailed description of the certain exemplary embodiments has been provided for the purpose of explaining the general principles and practical application, thereby enabling others skilled in the art to understand the disclosure for various embodiments and with various modifications as are suited to the particular use contemplated. This description is not necessarily intended to be exhaustive or to limit the disclosure to the exemplary embodiments disclosed. Modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from the scope thereof. Any of the embodiments and/or elements disclosed herein may be combined with one another to form various additional embodiments not specifically disclosed. Accordingly, additional embodiments are possible and are intended to be encompassed within this specification and the scope of the appended claims. The specification describes specific examples to accomplish a more general goal that may be accomplished in another way.

As used in this application, the terms "front," "rear," "upper," "lower," "upwardly," "downwardly," and other orientational descriptors are intended to facilitate the description of the exemplary embodiments of the present application, and are not intended to limit the structure of the exemplary embodiments of the present application to any particular position or orientation. Terms of degree, such as "substantially" or "approximately" are understood by those of ordinary skill to refer to reasonable ranges outside of the given value, for example, general tolerances associated with manufacturing, assembly, and use of the described embodiments.

What is claimed:

1. A luminaire comprising:

a housing including a first outer wall and a mounting wall configured to be secured to a structure; and

a support coupled to the housing and supporting a light emitter assembly, the support including a base configured to receive the light emitter assembly, a second outer wall, and a plurality of fins extending between the base and the second outer wall, wherein the second outer wall extends downwardly away from the base so that the light emitter is recessed in the support, the second wall having an outer edge positioned below the light emitter assembly relative to the housing,

wherein the plurality of fins include a first set of fins positioned along a first side of the base and a second set of fins positioned along a second side of the base, and

wherein a least one of the plurality of fins extends past the light emitter assembly toward the outer edge.

2. The luminaire of claim **1**, wherein the first set of fins are oriented in a first direction substantially parallel to the mounting wall and the second set of fins are oriented in a second direction substantially perpendicular to the mounting wall.

3. The luminaire of claim **1**, wherein the support includes a plurality of bosses and a plurality of holes, the luminaire further comprising a plurality of fasteners for securing the support to the housing, each of the fasteners extending through an associated one of the bosses and holes.

4. The luminaire of claim **1**, wherein the first outer wall defines a semi-cylindrical profile.

5. The luminaire of claim **1**, wherein the first outer wall defines a quarter-spherical profile.

6. The luminaire of claim **1**, wherein the first outer wall defines a trapezoidal profile.

7. The luminaire of claim **1**, wherein the plurality of fins extend outwardly and downwardly from the base to draw heat away from the housing.

8. The luminaire of claim **1**, wherein the housing includes a compartment defined at least partially between the outer wall and the mounting wall, the compartment configured to support a control device.

9. The luminaire of claim **1**, wherein the light emitter assembly includes a first set of light emitters controlled to be activated during a normal operation and a second set of light emitters controlled to be activated during an emergency mode.

10. The luminaire of claim **9**, wherein the second set of light emitters are activated during normal operation and the first set of light emitters are deactivated during the emergency mode.

11. A luminaire comprising:

a housing including a lower wall, an outer wall and a mounting wall, the mounting wall oriented in a vertical direction and configured to be secured to a structure;

a support coupled the housing, the support including a base, a first set of fins extending from the base away from the housing in the vertical direction, and a second set of fins extending from the base toward the housing in a vertical direction; and

a light emitter assembly connected to the base, wherein the light emitter assembly includes a first set of light emitters and a second set of light emitters.

12. The luminaire of claim **11**, wherein a first lens is positioned over the first light emitters having a first light distribution and a second lens is positioned over the second light emitters having a second light distribution different than then first light distribution.

13. The luminaire of claim **11**, wherein the second set of fins space the base from the housing.

14. The luminaire of claim **11**, wherein the first set of fins includes a plurality of fins oriented in a first direction substantially parallel to the mounting wall and a plurality of fins oriented in a second direction substantially perpendicular to the mounting wall.

15. The luminaire of claim **11**, wherein the support includes a plurality of bosses and a plurality of holes, the luminaire further comprising a plurality of fasteners for securing the support to the housing, each of the fasteners extending through an associated one of the bosses and holes.

16. The luminaire of claim **11**, wherein the mounting wall includes a conduit for receiving a conductor.

17. The luminaire of claim **11**, wherein the outer wall defines a semi-cylindrical profile, a quarter-spherical profile, or a trapezoidal profile.

18. The luminaire of claim **11**, wherein the support includes a sensor compartment.

19. The luminaire of claim **11**, wherein the first set of fins extend outwardly and downwardly from the base to draw heat away from the housing.

20. The luminaire of claim **11**, wherein the housing includes a compartment defined at least partially between the outer wall and the mounting wall, the compartment configured to support a control device.

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